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DEXTRAN -- A SELECTED BIBLIOGRAPHY

Chemical, Microbiological, Clinical, and Related Publications of Interest in the Use of Dextran as a Synthetic Blood Volume Expander

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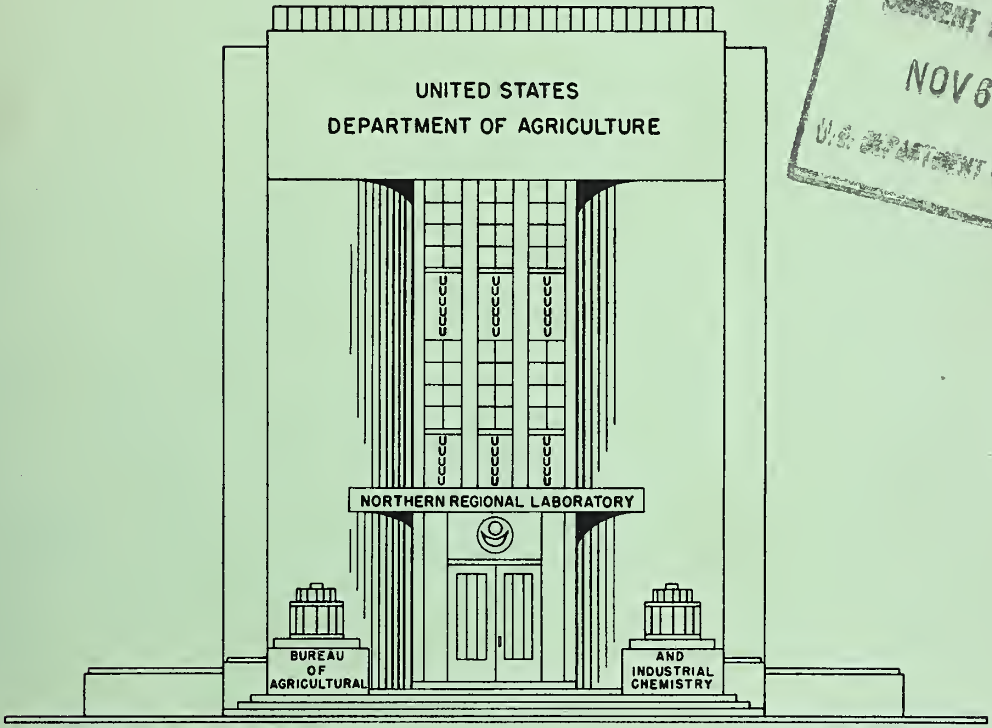

By Allene Jeanes

With the assistance of
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PEORIA, ILLINOIS

June 1952

DEXTRAN -- A SELECTED BIBLIOGRAPHY

Chemical, Microbiological, Clinical, and Related Publications of Interest in the Use of Dextran as a Synthetic Blood Volume Expander

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INTRODUCTION

Dextrans constitute a class of homologous polysaccharides synthesized from sucrose by *Leuconostoc mesenteroides* and its congeners, and consist of anhydroglucose units linked predominantly by α-1,6-bonds.

The rapidly expanding interest in dextrans has shown the desirability of compiling and classifying for ready use the significant literature references on these polysaccharides. The great majority of the publications listed here have appeared since 1940, although the oldest dates back to 1861. Currently, the rate of publication on dextran and closely related topics is high and may be expected to continue so for some time.

At present, the major active interest in dextran devolves around its use as a source of synthetic blood volume expander. However, other applications of dextran are being reported in medical experimentation and practice, as well as in the industrial field. Dextran is of further interest in fundamental research on carbohydrates, especially because of the ease with which the enzymes synthesizing it can be obtained and manipulated. All of these aspects are covered in this bibliography.

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For practical and theoretical reasons it has been deemed desirable to include references on substances and problems allied to dextran and its uses. Selected references have been included on other substances of similar origin, constitution or function such as levans, glycogens, dextrins, and pyrogens. A few significant references of a general nature have been included on other substances now also under investigation as synthetic blood plasma extenders.

Each topic has not been treated with equal thoroughness. Those covered most completely are in the fields of our own primary interests, that is, the production of native dextrans, and the properties, characterization, and structure of dextrans and related polysaccharides. Also thoroughly covered are the conversion of dextran to a synthetic blood volume expander, the utilization of dextran and degraded dextran in miscellaneous medical experimentation, and the industrial applications of dextran. We have not attempted to include all possible references on clinical results, nor on microbiology.

The main sources consulted in compiling the bibliography have been current issues of research journals, and *Chemical Abstracts, Biological Abstracts,* and the *Army Medical Library Current List of Medical Literature.* The bibliography on dextran issued by Pharmacia of Stockholm, and that on Plasma Substitutes by Karl A. Baer of the Army Medical Library were helpful. Except for a few references for which only abstracts were available, all items listed have been examined.

The four unverified references included are marked with an asterisk.

The organization and the general subjects included in this bibliography are as follows:

I. Microbiology

Occurrence, taxonomy, and nutritional requirements of microorganisms which produce dextrans, levans, or similar polysaccharides from sucrose or amylaceous materials.

II. Bacterial Production of Dextrans

Production of dextrans in bacterial cultures on both laboratory- and industrial-scale. A number of other references, which also might have been included here, seemed more suitably classified under section IV: Properties, Structure, and Characterization of Dextrans.

III. Enzymic Synthesis of Polysaccharides from Sucrose

Conditions and mechanism of enzymic synthesis from sucrose of dextrans, levans, and a glycogen-like polysaccharide. The similarity of origin of levans and dextrans and the fact that these polysaccharides are sometimes produced in the same synthesis mixture make it appropriate to include references on levans here. A reference is included on amylosucrase, an enzyme which synthesizes a glycogen-like substance from sucrose and is closely related in mode of action to dextransucrase and levansucrase.

Also included are references to tests on dextrans as activators in the enzymic synthesis of other polysaccharides.

IV. Properties, Structure, and Characterization of Dextrans

Chemical and physical characterizations of dextrans and related polysaccharides; action of acids and enzymes on dextrans; isolation and characterization of sugars from acid and enzymic hydrolyzates of dextrans.

V. Detection and Analysis

Methods suitable for application to dextran and related polysaccharides in animal fluids and tissues.

VI. Preparation and Use of Synthetic Blood Volume Expanders from Dextrans

A. General Topics

Editorials, news items, bibliographies. Included are references on general aspects of some other synthetic blood volume expanders.

B. Production of Synthetic Blood Volume Expanders from Dextrans

Included are properties and required characteristics of these substances.

C. Clinical Results

Response of human and animal subjects to infusion with synthetic blood plasma preparations from dextrans; reaction and fate of these materials in the body; results of miscellaneous therapeutic uses of clinical dextrans.

D. Antigenic and Serological Properties

Behavior of dextrans and levans. Related topics.

E. Miscellaneous

Medical experimentation with clinical dextrans and various other polymers.

F. Pyrogens

Origin, nature, action in animals; methods for avoiding and eliminating from solutions for parenteral infusion.

VII. Industrial Applications of Dextrans

Dextrans and their derivatives as emulsifying, stabilizing, and coating agents.

VIII. Review Articles and Books

General reviews and books dealing with dextran in its relation to the cane and beet sugar industries.

IX. Author Index

Acknowledgment

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